An Ingenious propoſal for a new ſort of Maps *of* Countrys, *together with* Tables *of* Sands *and* Clays, *ſuch chiefly as are found in the North parts of* England, *drawn up about* 10 *years ſince, and delivered to the* Royal Society *Mar.* 12. 1683. *by the Learned* Martin Liſter *M. D.*

WE ſhall then be better able to judge of the make of the *Earth*, and of many *Phænomena* belonging thereto, when we have well and duely examined it, as far as human art can poſſibly reach, beginning from the *outſide* downwards. As for the more *inward* and *Central* parts thereof, I think we ſhall never be able to confute *Gilbert's* opinion thereof, who will, not without Reaſon, have it altogether *Iron* *. And for this purpoſe it were adviſable, that a *Soil* or *Mineral Map*, as I may call it, were deviſed. The ſame *Map* of *England* may, for want of a better, at preſent ſerve the Turn. It might be diſtinguiſht into *Countries*, with the *River* and ſome of the noted *Towns* put in. The *Soil* might either be coloured, by variety of *Lines*, or *Etchings*; but the great care muſt be, very exactly to note upon the *Map*, where ſuch and ſuch *Soiles* are bounded. As for example in *Yorkſhire* (1.) The *Woolds*, Chaulk, Flint, and Pyrites, *&c.* (2.) *Black moore*; Moores, Sandſtone, *&c.* (3.) *Holderneſs*; Boggy, Turf, Clay, Sand, *&c.* (4.) *Weſtern Mountains*; Moores, Sand-ſtone, Coal, Iron-ſtone, Lead Ore, Sand, Clay, *&c.* *Nottinghamſhire*, moſtly Gravel Pebble, Clay, Sand-ſtone, Hall-playſter, or *Gypſum*, &c. Now if it were noted, how far theſe extended, and the limits of each Soil appeared upon a *Map*, ſomething more might

* De *Magn.* Lib. 1. Cap. 17. *Tellus in interioribus partibus magneticam homogenicam naturam habet.*

be

be comprehended from the whole, and from every part, then I can poſſibly foreſee, which would make ſuch a labour very well worth the pains. For I am of the opinion, ſuch upper *Soiles*, if natural, infallibly produce ſuch *under Minerals*, and for the moſt part in ſuch order. But I leave this to the induſtry of future times.

I ſhall entertain you at preſent, with a *Scheme* of *Sand*, and another of *Clay*, ſuch only which I have had the chance to meet with in *England*. As for the *Sand*, I have ſome reaſons to think, that it was once, the moſt exteriour and general cover of the ſurface of the whole Earth. Becauſe all our *Northern Mountains* are more or leſs covered with it at this day, and the higher the *Mountains*, ſtill the more, and the courſer the *Sand*: Becauſe the *Rivers* ariſing in the *Mountains* do yet dayly bring it down in great quantities, and that it has been ſo in all probability, in all Ages, ſince the firſt rains fell upon the face of the Earth, which ſeems to me to be truth like, in that the *Sea-ſhoares*, or Mouths of *Rivers*, are uſually barr'd with it; Beſides the *Sandy* Sea Grounds in moſt places of the *Sea*; and (which ſeems a clear evidence for the length of time) for that, the low grounds near theſe *Rivers* (which have been in all ages upon Record, *Moſſes*) if you pierce ſo deep into them, as to diſcover their bottom; you meet with this *Mountain Sand* in great quantities, and in ſome places a *Moſſe* under that, and the ſame Sand-beds under that. Now if we conſider how long theſe *Moſſes* or *Turf* is in growing, it being moſtly the leaves and roots of Plants, we muſt allow very many Ages for this purpoſe. And although *Herodotus* one of the moſt Ancient *Hiſtorians* that are, boldly conjectures that *Ægypt* long before our times, would be dammed up and uſeleſs by the great plenty of *Mud* yearly brought down that vaſt River; yet it does not appear, that the *Country* is much different from what it was in his time, ſo that the *Sand* and *Mud* is ſtill carryed to Sea.

Another

Another Argument of the Sands being the *Univerſal Cover* of the face of the Earth is, from the great hardneſs, and conſequently the durableneſs, and unalterable quality of this *Mineral*, above any other in *Nature*. For though many things are called *Sand*, from the ſmallneſs and little Cohæſion, or dryneſs of the grains, yet this kind of *Mountain Sand* above all others keeps its natural and original magnitude, and is not made (as moſt Sand is) by the Attrition and wearing of one particle of ſtone againſt another; But is of a conſtant and durable figure; and therefore, I ſay, it ſeems to me for this reaſon to be the moſt fit for an *outſide* or *cover* to the *Globe* of the Earth.

And if it ſhall be objected, that although we grant the high Mountains of *England* and *Europe*, are uſually firſt bedded with *Sand-Rocks*, if not ſtill covered in many places with looſe ſand, yet are there other *Mountains*, as the *high Woolds* all over *England*, not ſo, but their uppermoſt beds of ſtone are ſoft Chaulk. and on the ſmooth ſurface no appearance of any *Sand*. This indeed is in part granted; but that there is no where any *Sand*, upon the *Chaulk Mountains*, is not true; for to inſtance in thoſe inland *Sand Hills* above *Bulloine* in *Piccardy*, which ſand is the very ſame with that on the Sea ſhoar at *Calais*, and although this is not *England*, yet the Sea hath but accidentally divided us: for from *Dunſtable* Ex. gra. in *England*, even as far as the *Walls* of *Paris* by *Calais*, is as it were a continued *Woolds* of *Chaulk* and *Flint*. What difference there is betwixt the *Woolds* Mountain ſand, and that of the *Northerne Mountains* will beſt appear in the Table. Now the nakedneſs of the *Woolds*, is from the ſmallneſs of its ſand, which readily yielded not only to the *Rain* that fell, but to the *Wind* alſo. Which is evident from that vaſt tract of ſandy Hills, which bound the coaſts of *France*, *Flanders*, and *Holland*, and which have made their *Coaſts* ſo ſhallow in reſpect of *ours*, as being

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in great part blown off the *Yorkshire*, *Lincolnſhire*, *Suffolk*, or *Eſſex*, and *Kentiſh Woolds*, and wrapt up upon their *Coaſts*; and the reaſon of this is partly from the more conſtant *Weſterly* winds blowing over from our *Coaſts*; and alſo from the meeting of the two *Tydes*, *viz.* that of the *Channel*, and that other of *North Flood* upon their *Coaſts*.

I am well aware, that the finding of *Cockles* or *Shells*, as moſt *writers* are pleaſed to call them, upon *Mountains*, and ſand alſo there, is by the ſame *Herodotus* uſed as an Argument of a great *Deluge*, or inundation of waters; but as I have elſewhere I think demonſtrated, that the Rock-*Cochlites* are no *Shells*, ſo neither can I grant that the *Sand* was adventitious to the *Mountains*, but naturally originated there; for that it is there plainly to be found, ſome looſe, and the reſt in Beds, yet unlooſened; as I could name very many places, for inſtance, *Silden* and *Thorpe Fells* in *Craven*, this *Mountain Sand* is a white and tranſparent pebble, and ſome of it is ſmall and eaſily ſwept and blown away, ſo is there much of it upon the high Mountains mixt with white pebbles of greater Size.

'Tis the *Character* of this ſand, not to *yeild* to *fire*, as *Flint* will do; and though it agree with that and ſome other *metalls*, to ſtrike fire from *Steel*, yet it does not *calcine*, as Flint will be brought to doe. And therefore this *Sand* is the true *Tarſo* of the *Italian* Mountains, of which the fine *Venetian* Glaſs is made; and for this reaſon, the *Flint-Glaſſes* were here in *England* ill compounded, the *Forreiners* miſtaking the *materials*, which yet our *Country* affords in plenty, all over the *Northern*, and (I doubt not) the *Weſterne* mountains too: I have ſeen from the *Scotch* mountains very excellent and large.

A Table

A Table of Sand (*drawn up about X. years ſince*) *ſuch chiefly as I have found in the* Northern *parts of* England.

- Sand.
  - Sharpe or Rag-Sand, compoſed of ſmall tranſparent pebbles, naturally found upon the Mountains, not calcinable.
  - Fine
    - White
      - *Stitneham* Moor in the Road waſh'd up very white Pebble.
      - *Flamborough* head, of which the Light houſe there is cemented.
      - *Calice Sand*; burns reddiſh, but falls not in water.
    - Grey
      - *Seaton* Banks near *Hartlepool* or the *Tees mouth*, *Eſcrick*, in the Gravell pit there.
      - A vein of exceeding fine Sand.
    - Reddiſh
      - The Pillow Sand in the *Baltick*.
    - Browne
      - In a Spring at *Heſhington*.
      - The Sand at the *Bath* in *Somerſetſhire*.
  - Courſe
    - *Acome* near *York* drifted Sand.
    - Greiſly
      - *Hutton* Moor waſht.
      - *Thorpe* Fells.
      - *Owze* at *York*.
      - *Nid* at *Mountain*.
      - Dug up at *Rawcliff* near *Snath*
      - *Wharfe* at *Ickly* and *Denton*.
      - *Air* at *Carleton* in *Craven*.
      - *Eure* at *Bolton*.
    - Browne
      - *Gauton*.
      - *Santon* in *Lincolnſhire*.
      - *Bomeby* Common.
      - *Skipwith* Common.
  - Soft or ſmooth with flat particles.

- From Limeſtone.
  - At ..... in *Yorkſhire.*
  - A Vein at *Oswell* Beacon in *Lincolnſhire.*
- With *Mica* of Glittering particles,
  - Of *Weſtmorland*
    - Silver like
      - Sea ſand about the *Sylly* Iſlands.
      - In *Cleveland* and about *Scarborough.*
      - *Ouze* duſt, or ſediment at *Rawcliff.*
    - Gold like
      - A Vein of *Mica* in *Heſlington* Gravel Pit.
      - *Mica Argentea* in Red ſand Rock near *Rippon* plentifully.
      - *Mica Aura* of *Cleveland.*

Alſo I here give a Scheme of *Clays*, as well becauſe it ſeems to be another Coat of the *Terreſtrial Globe* in the more depreſſed and hollow parts thereof, as becauſe the mixture of *Sand* and *Clay* is not unuſually called *Earth.* Yet this terme being too large it will be convenient, as I think, to limit it to ſuch a mixture as we uſually find upon the ſurface of the ground, which hath ever in it, beſides ſuch *Sands* and *Clays*, as either the *Soyle* naturally produces, or have by *Floods* or *Winds*, or other *accidents* been brought thither, a great part of the rotten parts of *Plants* and *Animals.* And in this ſenſe *Turff* is Earth, which is moſtly where the *Erica* or *Heath* grows, becauſe it is made up of the deciduous Leaves of that *Plant*, which being by the Current of ſhowr's brought together, make up the *Moores*, *Moſſes*, and *Fens*, and in the *Mountains* in hollow Baſons or Depreſſures without Vent; *Moſſes* of incredible depth, 1. or 2. *Fathom* ordinarily in the ſame kind of Black Earth, called *Peat* or *Turff.*

A Table

A Table of Clays.

- Pure, that is, ſuch as is ſoft like Butter to the Teeth, and has little or no greetineſs in it.
  - Greaſy, to be reckoned amngſt the Medicinal Earths, or *Terræ Sigillatæ*.
    - 1. Fullers Earth
      - Yellowiſh
        - At *Brickhill* in *Northamptonſhire*.
        - At ..... under the *Yorkſhire* Woolds.
      - Brown about *Hallifax*.
      - White in *Derbyſhire* Lead Mines.
    - 2. Boli
      - In *Cleveland*.
      - At *Linton*, upon *Wharfe*.
    - 3. Pale yellow, in the Marle pit at *Ripley*.
    - 4. Cow ſhot clay, or the Soap ſcale lying in Coal Mines.
    - 5. A dark blew-clay or Marle at *Tolthrop*.
  - Harſh and duſty when dry.
    - 6. Creta properly ſo called, or the Milk white Clay of the Iſle of *Wight*.
    - 7. The Potters pale yellow Clay of *Wakefield* Moor.
    - 8. The Blew Clay of *Bullingbrook* Pottery in *Lincolnſhire*.
    - 9. A Blew clay in *Bugthorp* Beck, in which the *Aſtroites* are found.
    - 10. Yellow Clay in the ſeames of the Red ſand Rock at *Bilbro*.
    - 11. Fine red clay in Red ſand Rock,
      - at *Bilbro*
      - at *Rippon*.
    - 12. A ſoft chalky blew clay
    - 13. A ſoft chalky red clay
      - at *Buttercrain*.
  - Stony when dry.
    - 14. A Red ſtone clay
    - 15. A Blew ſtone clay
      - In the Banks of *Whitcar* beck, near *Leppington*: & at *Houſam* in the Milſcar.
    - 16. Clunch, a white ſtone clay in *Cambridgſh*.
- Mixt with Round Sand or Pebble.

17. The yellow Loame of *Skipwith* Moor *Yorkſhire*.
18. A Red ſandy clay in the right hand bank of the Road beyond *Collingham*, near the lime Kilns going to -----
19. A Red ſandy clay in the Red ſand Rock near *Kippon*.

With flat or thin ſand, glittering with *Mica*.

20. *Crouch* white clay *Derbyſhire*, of which the Glaſs-pots are made at *Nottingham*.
21. Grey or blewiſh Tobacco Pipe clay at *Halifax*.
22. A Red Clay in the Red ſand Rock at *Rotherham*.

Obſervations